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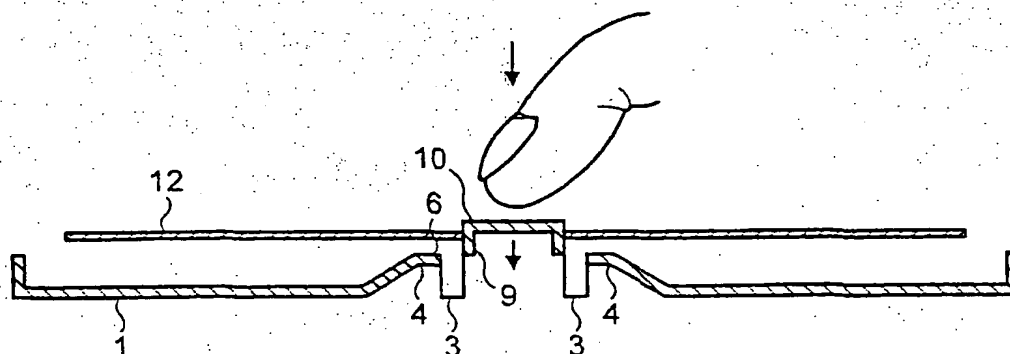
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(54) Title: DISC HOLDING APPARATUS



(57) Abstract: Apparatus used for holding a disc (12) including a lower surface and an upper surface with an opening extending between the surfaces, comprises a base (1) and a hub (2) extending upwards from the base. The hub includes a centre portion (6) adapted to pass through the opening of the disc and engage the upper surface of the disc (12) to hold the disc on the hub. The hub (2) includes outer pieces (4), non-movable with respect to the base (1), for arresting downward movement of the disc (12) during its removal.

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DISC HOLDING APPARATUS

Background to the Invention

5 This invention relates to a disc holding apparatus used for retaining a disc, in particular a disc on which information is recorded such as an audio compact disc (CD) or CD-ROM, digital versatile disc (DVD) or computer game disc, in a storage case or the like.

10 Known disc storage cases have a central hub which extends through and engages the hole in the centre of the disc and which is depressed to remove the disc. One disadvantage of conventional hubs is that they generate an unpleasant cracking sound on removing or replacing the disc. A further disadvantage is that repeated usage of the hub can cause visible cracks and scratches on the centre of the disc, affecting the disc's quality and/or performance.

15 It is known to provide means for causing the disc to be ejected from the hub when the latter is depressed. For example, EP-A-356539 and US-A-5251750 describe outwardly extending cranked ejection arms and WO 96/14636 describes a plurality of inwardly extending resilient cantilevered arms in the base. All of these ejection means are inconvenient to manufacture.

20

Summary of the Invention

The present invention seeks to provide a disc holding apparatus in which both noise and cracking/scratching of the disc during removal or replacement of the disc are minimised.

25

It is also an aim of the invention to provide a disc holding apparatus that is easier to use for consumers, particularly those with co-ordination disabilities.

30 According to the invention there is provided apparatus for holding a disc including a lower surface and an upper surface with an opening extending between the surfaces, the apparatus comprising a base and a hub extending upwards from the base, the hub including a central portion adapted to pass through the opening of the disc and engage the upper surface of the disc to hold the disc on the hub, characterized in that the hub

includes outer pieces, non-movable with respect to the base, for arresting downward movement of the disc during its removal.

5 Preferably, there are two outer pieces, and these may have substantially parallel inner edges.

The central portion of the hub may comprise a first wall portion extending upwards from the base and a second wall portion extending inwardly from the first wall portion above the base. A pair of disc-engaging arms, preferably spaced from one another and preferably substantially perpendicular to the second wall portion, may extend upwards
10 from the second wall portion. Preferably, the central portion is arranged to be pushed down from a resting position to a depressed position to release the disc from the hub, and each arm has a portion which engages the upper surface of the disc when the central portion is in the resting position and disengages from the upper surface of the
15 disc when the central portion is moved to the depressed position. The central portion preferably functions as a spring to return it from the depressed position to the resting position.

In a preferred embodiment, the arms include upper walls, which cooperate to form a
20 central push button for the hub.

Brief Description of the Drawings

In order that the invention may be more readily understood, reference will now be made, by way of example only, to the accompanying drawings, in which:
25

Figure 1 is a plan of apparatus according to the invention;

Figure 2A is a section along the line II-II of Figure 1, also showing a disc, with the central portion in the resting position;
30

Figure 2B is a fragmentary section, similar to Figure 2 but with the central portion in the depressed position;

Figure 3A is a section along the line III-III of Figure 1, also showing a disc, with the central portion in the resting position; and

Figure 3B is a section similar to Figure 3 but with the central portion in the depressed position.

The drawings show the portion of a video-style library case for a compact disc or the like adapted to hold the disc. However, it should be understood that the invention also extends to trays provided as inserts in jewel cases, that is clear hinged cases for discs.

10 The case (or alternatively the tray) is preferably injection moulded in one piece from polypropylene or a material with similar characteristics.

The case has a flat base 1, with an upwardly extending substantially circular central hub 2. The hub is divided by two parallel slots 3 into two outer pieces 4 and a central portion 5. The outer pieces 4, formed from segments of the circular hub 2, each have an upwardly sloping outer wall and an abutment surface 6.

The central portion 5 of the hub comprises an upwardly sloping first wall portion 7, and a second wall portion 8 parallel to the base. The wall portions are such that in the absence of the slots 3, in the resting position the upwardly sloping walls of the outer portion would form a continuous frustoconical surface with the first wall portion 7, and the abutment surfaces 6 would form a continuous annular surface with the second wall portion 8.

25 A pair of substantially semicircular disc-engaging arms 9 extends upwardly from the centre of the second wall portion 8. The arms each have an upper wall 10, parallel to the base, and the upper walls together form a central push button for the hub. The outer edge portions 11 of the upper walls 10 extend outwardly from the arms 9 and are radiused in cross-section.

30

Figures 2A and 3A show the central portion of the hub in its resting position with a disc 12 held on the central portion, its central opening being placed over the push button.

The outer upper edge portions 11 engage the upper surface of the disc at the opening therein and retain the disc 12 in place.

By depressing the push button in the direction of the arrow, the entire central portion 5
5 between the slots 3 is depressed. The outer upper edge portions 11 move the disc downwardly until its motion is arrested by the abutment surfaces 6 of the outer hub pieces 4. The disc engaging arms 9 then move together as the radiused upper edge portions 11 move through the opening in the disc, releasing it from engagement as
10 shown in Figure 3A. This may be achieved either with the case on a flat surface or with it held in one hand.

To replace the disc, the user simply places the disc with the opening over the push button and presses the disc down.

CLAIMS

1. Apparatus for holding a disc including a lower surface and an upper surface with an opening extending between the surfaces, the apparatus comprising a base and a
5 hub extending upwards from the base, the hub including a central portion adapted to pass through the opening of the disc and engage the upper surface of the disc to hold the disc on the hub, characterized in that the hub includes outer pieces, non-movable with respect to the base, for arresting downward movement of the disc during its removal.
- 10 2. Apparatus according to claim 1, wherein there are two outer pieces.
3. Apparatus according to claim 2, wherein the outer pieces have substantially mutually parallel inner edges.
- 15 4. Apparatus according to claim 1, 2 or 3, wherein the central portion of the hub comprises a first wall portion extending upwards from the base and a second wall portion extending inwardly from the first wall portion above the base.
- 20 5. Apparatus according to claim 4, wherein a pair of disc-engaging arms extends upwards from the second wall portion.
6. Apparatus according to claim 5, wherein the arms are spaced from one another.
- 25 7. Apparatus according to claim 6, wherein the arms are substantially perpendicular to the second wall portion.
8. Apparatus according to claim 5, 6 or 7, wherein the central portion is arranged to be pushed down from a resting position to a depressed position to release the disc
30 from the hub, and each arm has a portion which engages the upper surface of the disc when the central portion is in the resting position and disengages from the upper surface of the disc when the central portion is moved to the depressed position.

9. Apparatus according to claim 8, wherein said portion which engages the upper surface of the disc comprises a radiused outwardly extending upper edge of the arm.
10. Apparatus according to any one of claims 5 to 9, wherein the arms include
5 upper walls which cooperate to form a central push button for the hub.
11. Apparatus according to claim 1, wherein the central portion is arranged to be moved from a resting position to a depressed position to release the disc from the hub.
- 10 12. Apparatus according to claim 8, 9, 10 or 11, wherein the central portion functions as a spring to return it from the depressed position to the resting position.

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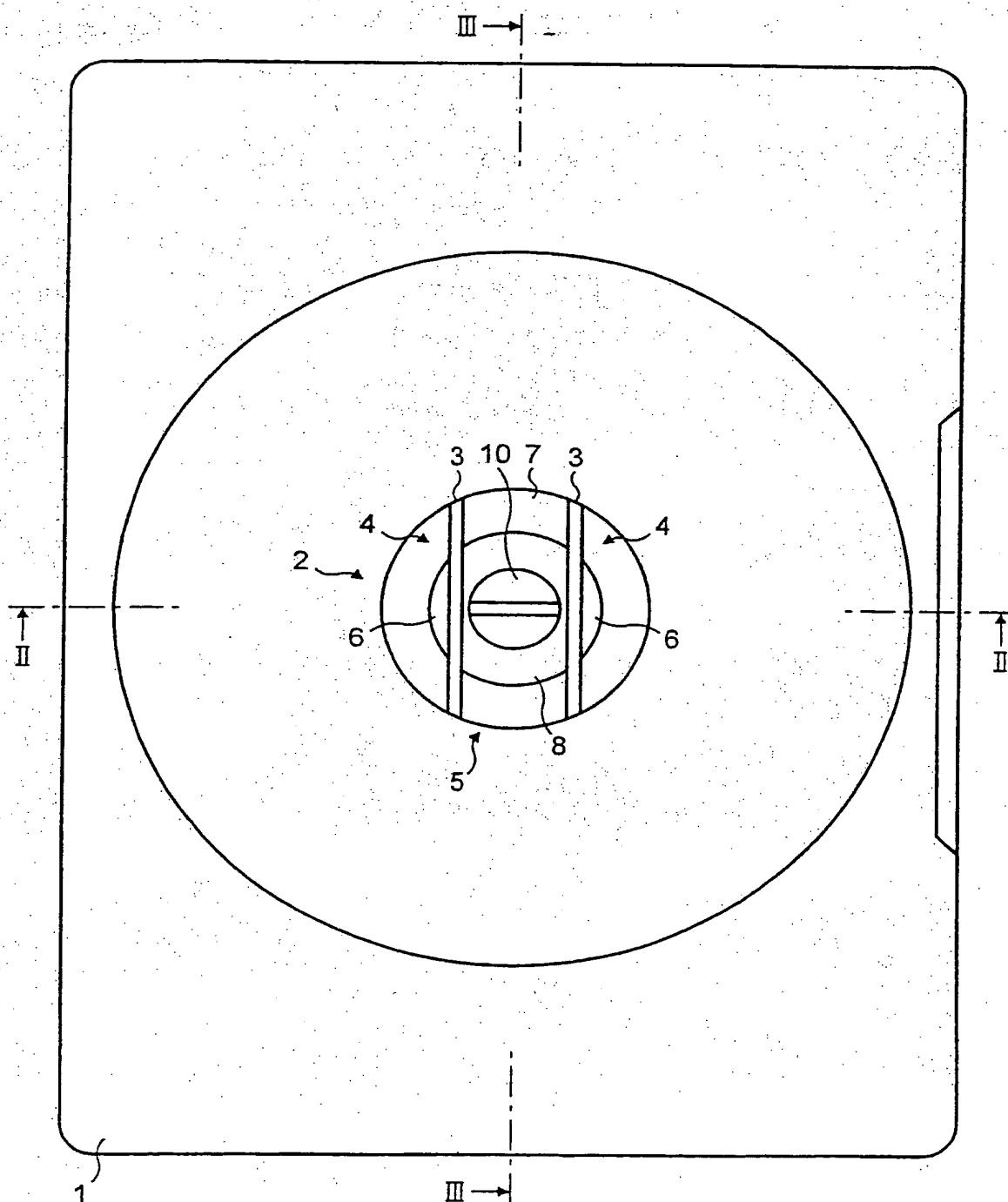


FIG. 1

2 / 3

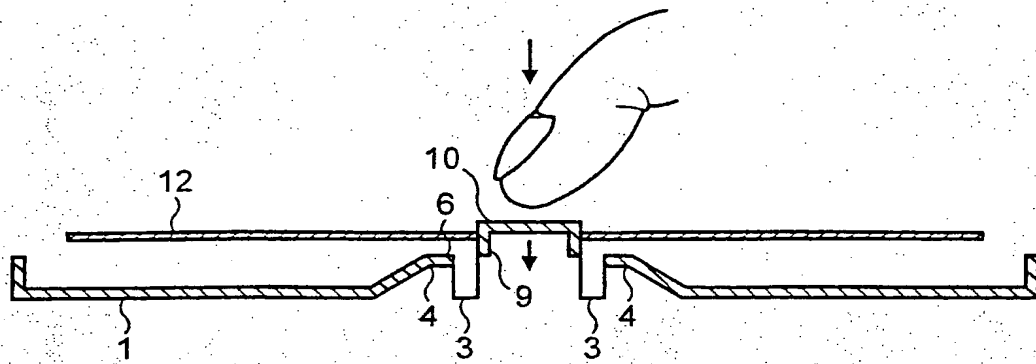


FIG. 2A

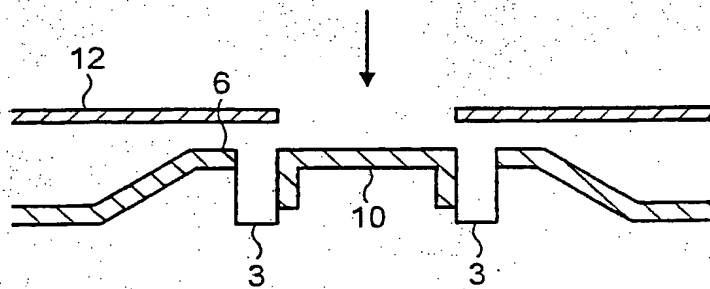


FIG. 2B

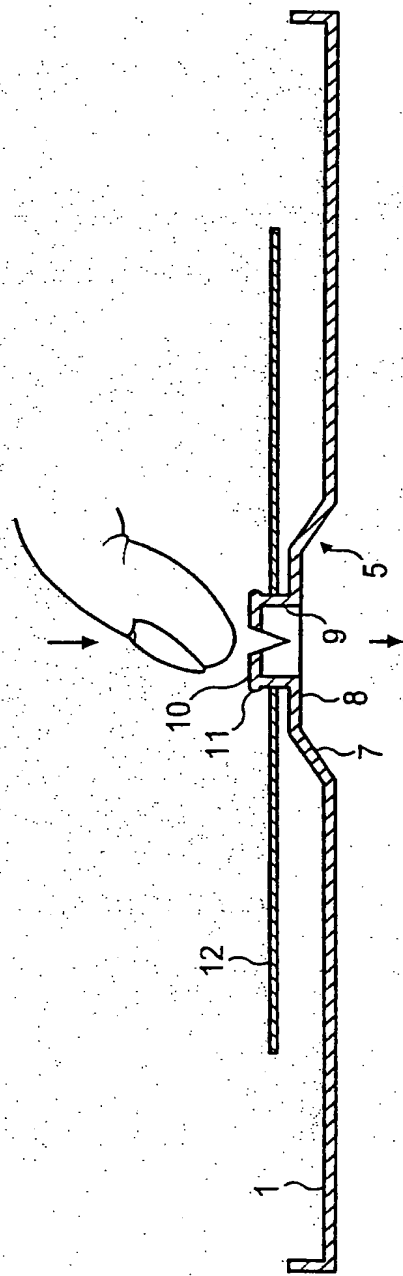


FIG. 3A

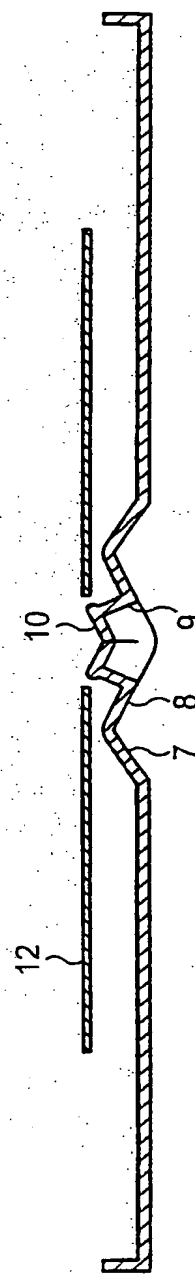


FIG. 3B

INTERNATIONAL SEARCH REPORT

Int'l Application No

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A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G11B33/04 G11B23/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 944 181 A (LAU KWOK DIN) 31 August 1999 (1999-08-31)	1,2,4-12
Y	column 4, line 17 -column 5, line 50; figures	3
Y	FR 2 765 999 A (MOULAGES DU VELAY SA) 15 January 1999 (1999-01-15)	3
A	abstract; figures page 6, line 15 -page 7, line 28	1,2,4-12
X	US 6 085 900 A (WONG CHI MAN) 11 July 2000 (2000-07-11) abstract; figures column 3, line 51 -column 4, line 51	1,2,4-12
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Int. Patent Application No.

PCT/GB 01/04406

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